DECLARATION

I, Keiko HOSHI, c/o the Inoue & Associates of 3rd Floor, Akasaka Habitation Building, 3-5, Akasaka 1-chome, Minato-ku, Tokyo, Japan do solemnly and sincerely declare that I am conversant with the Japanese and English languages and that I believe:

that the description "refractivity" at page 3, line 3 of the English specification should be amended to --reflectance--; and

that the description "reflectance" at page 113, line 6 of the English specification should be amended to --refractive index--.

These amendments are merely corrections of inadvertent errors which occurred at the time of the translation into English of the original PCT specification. The attached copies of revised pages 3 and 113 of the English specification are true and correct translations of the corresponding pages of the international patent application No. PCT/JP2004/002012. The English description "reflectance" at revised page 3, line 3 of the English specification is a correct English translation of the Japanese description "反射率" in the original Japanese PCT specification at page 2, lines 10 to 11. The Eng-

lish description "refractive index" at revised page 113, lines 6 to 7 of the English specification is a correct English translation of the Japanese description "屈折率" in the original Japanese PCT specification at page 78, line 3.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

February 1, 2006
(Date)

Keiko Hoshi
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Therefore, studies have been made on antireflection films having a single-silica-layer structure, and it has been found that the reflectance of such a single-silica-layer antireflection film can be reduced when the antireflection film satisfies the conditions mentioned below. Thus, studies have been made for developing a single-silica-layer film which satisfies such conditions. Specifically, it is known that, in the case of an antireflection film comprising a substrate and, formed thereon, a single-silica-layer film, the minimum value of the reflectance R of the antireflection film can be expressed by the formula: $(n_s - n^2)^2/(n_s + n^2)^2$, wherein n_s represents the refractive index of the substrate and n represents the refractive index of the single-silica-layer film, with the proviso that $n_s > n$. Therefore, it has been attempted to reduce the reflectance R by adjusting the refractive index n of the single-silica-layer film to a value which is as close as possible to $n_s^{1/2}$ so that n^2 and n_s become as close as possible to each other.

More specifically, when a conventional transparent substrate having a refractive index n_s of from 1.49 to 1.67 (e.g., glass (n_s = about 1.52), polymethyl methacrylate (n_s = about 1.49), polyethylene terephthalate (hereinafter, frequently referred to as "PET") (n_s

INDUSTRIAL APPLICABILITY

In the silica-containing laminated structure of the present invention and the antireflection film of the present invention which comprises the silica-containing laminated structure, the porous silica layer formed on the substrate exhibits a refractive index of as low as 1.22 or more and less than 1.30, high light transmittance and excellent mechanical strength. Therefore, the silica-containing laminated structure and the antireflection film can be used as an optical part in various application fields, such as the fields of eye-glasses, automobiles, housing and building, agriculture, devices relating to energy, electronic information devices, household articles, business articles, and amusement articles.

Further, by using the coating composition of the present invention, it becomes possible to form an excellent porous silica layer at a temperature which is lower than that employed in the prior art and, hence, it has become possible to form a porous silica layer on an optical film or the like which has poor heat resistance and which cannot be used in the prior art.

光学部品、眼鏡のレンズ、ディスプレイ装置のスクリーンなどを被覆して用いる反射防止膜としては、単層または複数層からなるものが知られている。単層および2層からなる反射防止膜は、反射率が大きくなってしまうため、屈折率の異なる3層以上を積層したものが好ましいと考えられてきた。しかし、3層以上を積層させるのは、真空蒸着法、ディップコーティング法等の公知のどのような方法を用いても、単層に比べ工程が煩雑であるとともに生産性に劣るという欠点があった。

そこで、単層のものであっても下記の条件を満足すれば反射率の低減が可能であることが見出され、下記条件を満足する単層膜の開発が検討されてきた。即ち、基材の屈折率をn_s、単層膜の屈折率をnとし、$n_s > n$である場合、反射率Rは極小値として$(n_s - n^2)^2 / (n_s + n^2)^2$をとることを利用し、$n^2$と$n_s$の値とがなるべく近くなるように単層膜の屈折率nを$n_s^{1/2}$に近づけて反射率を低減させることが試みられてきた。

具体的には、透明基板としてガラス（n_s＝1．52程度）やポリメチルメタクリレート（n_s＝1．49程度）、ポリエチレンテレフタレート（以下、PETと称す。）（n_s＝1．54～1．67程度）、トリアセチルセルロース（n_s＝1．49程度）からなる基板のように屈折率n_sが1．49～1．67のものを用いると、単層膜に要求される目標屈

産業上の利用可能性

本発明のシリカ含有積層体、及びこれを含む反射防止膜においては、基板上に形成された多孔性シリカ層の屈折率が１．２２以上１．３０未満と低く、高光透過性であり、且つ機械的強度に優れるので、上記シリカ含有積層体及び反射防止膜は、光学部材として、メガネ分野；自動車分野；住宅・建築分野；農芸分野；エネルギー分野；電子情報機器分野；家庭用品分野；業務用分野；娯楽分野等、広範な用途に応用することができる。

また、本発明の塗布組成物を用いると、従来に比較して低温で上記の優れた多孔性シリカ層を形成することが可能になるため、従来不可能であった耐熱性の低い光学フィルム等を基板として用いることが可能になる。